Revd. — 15,000 — 8-28-69
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FACT SHEET

L-851

KEYS TO PROFITABLE SMALL GRAIN PRODUCTION IN THE CENTRAL WEST TEXAS AREA

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Soil and Climatic Conditions

Small grains are well adapted to the deep, fertile soils of Central West Texas. They normally are grown on the fine-textured loamy soils. Practically all the small grains are fall-sown, since spring-sown grain usually yields and weighs less because of heat and dry weather.

Wheat predominates in the area because of superior winter-hardiness, ready market demands and economic returns. Barley, less winter-hardy than wheat, produces profitable returns from winter pasture and grain on less soil moisture when managed properly. Oats, least winter-hardy of the four small grains, continues to occupy a moderate acreage in the area, although some varieties are seeded in the spring for livestock pasture.

Small grains respond well to irrigation, which is available in limited amounts. Soils should have adequate surface drainage to permit normal plant growth and root development, avoiding severe damage to the crop by grazing livestock. Rye, the most hardy cereal, occupies some acreage on sandy soils to which it is best adapted. Rye produces some grazing during the coldest winter months when other small grains cease growth.

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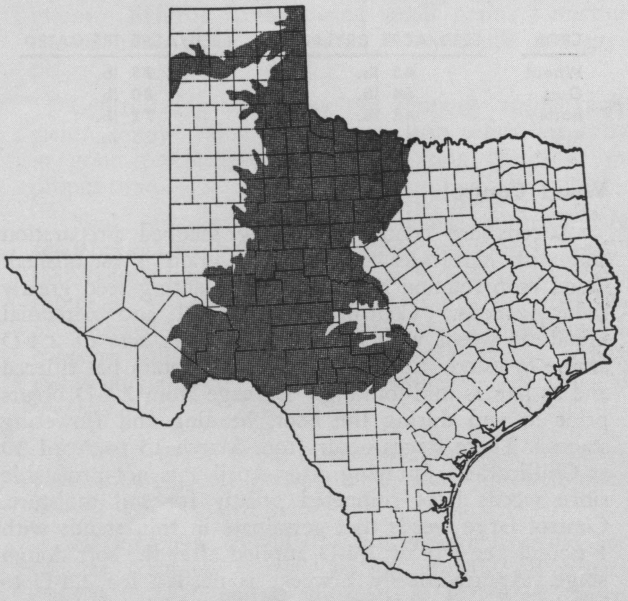

Central West Teaxs Area

Barley is the most tolerant and oats the least tolerant to soil salinity.

Rotations

Economics prevent many farmers from routinely rotating small grains with other crops. Growing small grains continuously on the same land increases possibility of damage from brown wheat mites, winter grain mites and soil borne diseases. Small grains grown in sequence with other crops or fallow result in more stable production. Rotations recommended include: (1) small grain - fallow - small grain; (2) small grain - fallow - grain sorghum - fallow - small grain; or (3) small grain - cotton - grain sorghum. Rotating wheat with Austrian Winter peas and guar has increased yields in this area. Rotations which require double cropping generally are not desirable in the dryland area. The fallow practice may not increase yields enough to justify the operation.

Seedbed Preparation

Seedbed preparation methods vary with the area, previous crop and soil type, but a smooth firm seedbed is most desirable. Important considerations are: (1) proper physical condition to allow rainfall penetration and conservation; (2) good surface drainage for normal plant growth and to avoid severe damage during grazing; (3) weed control; (4) wind and water erosion control; (5) avoidance of accumulation of excessive undecomposed organic material in the seed zone near planting time. Stubble-mulch tillage is recommended for dryland production, although this practice tends to perpetuate root rot, other diseases and some insect problems. Yields generally are slightly higher on subtilled land than on plowed or one-wayed land. When land is to be fallowed following a crop, use minimum tillage for weed control, adequate water penetration and maintenance of crop residues to help avoid erosion.

Quality Seed

Use good-quality seed of an adapted variety — plump, true to variety, high germinating and free from other crop, weed seed and trash. Trash in planting seed affects drill operation, resulting in poor seed distribution and uneven stands. Certified seed meets all the above requirements. Good seed is one of the cheapest, yet most effective, investments a grower can make.

Good quality seed is obtained at minimum cost by annually planting a small acreage to certified seed for next year's acreage. Planting seed, produced in this manner or purchased from a neighbor, should be grown on land free of noxious weeds. Proper cleaning and

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seed treatments, plus a germination test prior to seeding, helps insure good stands.

For information on varieties adapted to your area, see your Extension agricultural agent.

Seed Treatment

Treat all small grain seed with an approved fungicide and with an insecticide if needed. Certified seed generally are treated with a fungicide by the seedsman. Seed treatment controls some seed-borne diseases and may reduce infection from diseases carried over in previous crop residue. Seed treatment is good insurance against seedling blights and some smuts. Several effective fungicides with suggested rates follow:

CHEMICAL (TRADE NAMES)	WHEAT, OATS AND BARLEY
Agrox	½ oz. per bushel
Ceresan L	½ oz. per bushel
Ceresan M	½ oz. per bushel
Chipcote 25	¼ oz. per bushel
Chipcote 75	¾ oz. per bushel
Mer Sol 48	¾ oz. per bushel
Ortho LM	¾ oz. per bushel
Panogen 15	¾ oz. per bushel
Panogen 42	¼ oz. per bushel

For production of *planting seed only,* Vitavax Seed Protectant may be used to control loose smut of barley and wheat. Apply 4 ounces of Vitavax to 100 pounds seed. The material is compatible with the commonly used barley and wheat seed treatments. Do not treat seed with Vitavax if the crop is to be sold for grain.

Fertilization

Base fertilization programs on long-time averages and not on last year's production performance alone. Follow sound consistent fertilization and soil management practices, flexible enough to cope with seasonal moisture changes. Moderate nitrogen and phosphorus rates have given economical yield increases in seasons of adequate rainfall. Potash is seldom needed.

A soil test is the best way to determine nutrient content and fertilizer needed. Amount of a given nutrient to apply depends on the level of that nutrient in the soil, crop history including residue, available moisture, grazing practices and general management. Information on the previous crop and grazing management to follow should accompany a soil sample to the Soil Testing Laboratory.

Small grains which are grazed usually need more fertilizer than ungrazed grain. Nitrogen increases forage production, but grazing also removes much of the nitrogen applied in the fall. Nitrogen requirements are higher when small grains follow grain sorghum and other high residue crops.

Do not apply nitrogen in contact with seed, particularly wheat and barley. A split application with about half the nitrogen and all the phosphorus applied and incorporated into the soil prior to seeding is suggested. This practice increases early growth, winter-hardiness and grain yields. Apply the remainder of nitrogen as a top-dressing in the late winter at about livestock removal time or prior to jointing. If all nitrogen is applied in the fall, excessive growth of ungrazed grain which might be winterkilled is reduced by delaying seeding date until around November 1.

Without soil test information, the following general rates of nitrogen and phosphorus are suggested, except when following heavily fertilized crops where no phosphorus may be needed or where a nitrogen-producing legume has preceded small grain:
Not grazed — 15-40-0 in the fall, 30-0-0 in the spring.
To be grazed — 30-40-0 in the fall, 30-0-0 in the spring.

Irrigation

Forty to 50 bushel per acre wheat yields require approximately 30 inches of usable water during the growing season. Oats and barley, at 60 to 90 bushels of grain per acre, have similar demands. One fall irrigation usually provides good livestock grazing. If planting moisture is adequate, this irrigation may be made following emergence or 2 to 3 weeks before grazing. A second irrigation may be required in January or early February, depending on moisture received.

When irrigation water is limited, consider preplant irrigation since a longer period can be used in wetting the soil profile. In the spring, apply water for optimum soil moisture during the peak use period of booting, heading, flowering and milk growth stages. Irrigation timing cannot be predicted in advance because of rainfall variations and other weather conditions. Begin field irrigation early so that the last plants watered do not suffer for moisture.

For further information, see L-355, "How To Estimate Soil Moisture By Feel," and L-754, "Soil Moisture Storage," from the local county agricultural agent.

Seeding Dates and Rates

Suggested seeding date for grain and forage production is from early to mid-September. For grain production only, seeding dates vary from mid-September in the northern part of the area to November 1 in the southern portion.

Heavy seeding rates do not appreciably increase total forage. Early production is favored to some extent by the heavier seeding rates. On this basis, the following seeding rates are suggested:

CROP	SEED/ACRE DRYLAND	SEED/ACRE IRRIGATED
Wheat	45 lb.	75 lb.
Oats	64 lb.	80 lb.
Barley	48 lb.	72 lb.
Rye	45 lb.	75 lb.

Weed Control

Weeds are controlled during seedbed preparation and with herbicides applied after grain is established. Good crop rotation and weed-free planting seed greatly reduce weeds. Control small annual and perennial broadleaf weeds with ½ to 1 pound per acre of 2,4-D amine or ester. Spray 2,4-D after the grain has tillered and as late as mid-jointing. Damage from 2,4-D occurs prior to and during the boot, heading and flowering stages. These stages occur from March 15 to April 30 at Chillicothe. Spraying after April 1 is not profitable since weeds have competed greatly for soil moisture. Control large weeds that germinate in thin stands with 1 pound per acre of 2,4-D applied after the soft dough stage. Approximately 2 weeks is needed for 2,4-D to kill large weeds. Apply as early as possible.

Avoid spraying 2,4-D when wind conditions may cause drift to adjacent susceptible crops, such as cotton, and vegetables. Users of hormone-type herbicides must

DESCRIPTION AND SUGGESTED CONTROL OF SMALL GRAIN DISEASES

DISEASE	SOURCE OF INFECTION	CONTROL SUGGESTIONS
Leaf rust and stem rust	Air-borne spores.	Use resistant varieties when available. Experimental fungicides look promising, but are not approved for use.
Foot rot, root rot, crown rot, septoria and other leaf spots	Crop residue in soil and air-borne spores. Seed-borne.	Rotate with unrelated crops and practice good crop residue management. Treat seed with protectant fungicide.
Loose smut of wheat and barley	Fungus is present within infected seed. Infection takes place at flowering time and infected seed appear the same as those uninfected.	Use seed free of loose smut infection. Do not locate fields producing planting seed near commercial fields where many loose smut spores may be produced.
Other smuts	Spores of fungus may be present on seed or in soil.	Use protectant fungicide as seed treatment.
Wheat streak mosaic	Virus is transmitted by the wheat leaf curl mite.	Destroy volunteer wheat. Avoid early planting where this disease is a problem.
Yellow dwarf	Virus is transmitted by aphids.	Control aphids and use varieties that show less damage when infected.

comply with the State herbicide law and regulations in regulated counties.

For detailed weed control information see B-1029, "Suggestions for Weed Control with Chemicals."

Insect Control

Insects may cause serious damage to small grains when conditions are favorable. Crop rotation and elimination of volunteer grain often reduces damage, since aphid and spider mite populations are diminished thus breaking the production cycle. See detailed information on insect control in MP-339, "Texas Guide for Controlling Insects on Grain and Forage Crops." See L-819, "Greenbugs on Sorghum and Small Grains".

Grazing Practices

Wheat, oats, barley and rye usually provide a source of green forage for livestock during late fall, winter and early spring. Barley grows off more rapidly in the fall and furnishes pasture more quickly than other small grains. Returns from grazing small grains sometimes exceed grain value, depending on livestock and grain prices.

Controlled grazing may not seriously reduce grain yield. Forage value should more than offset any losses in grain production, provided grazing ceases at the proper time.

Rank, succulent small grain plants are easily damaged by low temperatures. Properly controlled grazing may reduce low temperature damage and save the crop for grain. Kansas research indicates that fall pasturing of fallowed wheat increases yields because it tends to conserve soil moisture. Early spring pasturing reduces yields only slightly; late spring pasturing reduces yields severely.

Young small grain plants are damaged by severe defoliation. Delay grazing until plants are well established.

Stocking rate should be light enough to avoid continuous, complete removal of top growth. If a grain crop is desired, remove livestock in the West Central Texas Area from March 1 to 15. To avoid injury, remove livestock before the plants begin to joint and before the growing point, which is starting to develop into a head, gets far enough above ground level to be removed by grazing.

Barley and rye, earlier in heading than wheat or oats, may be injured more by late grazing. Kansas research shows grazing wheat delayed maturity from 1 to 4 days. The more closely wheat was grazed, the later it matured.

Late spring grazing retards maturity of wheat and causes the grain to shrivel.

Grazing may be harmful on sandy soils or on stands thin and poor. Removing top growth on sandy soils may lead to excessive wind erosion. Thin stands also may be damaged by livestock trampling and pulling out of plants. Do not graze all top growth; leave some to hold the soil and provide plant protection.

Harvesting

Begin harvest when grain moisture content is reduced from 12 to 13 percent. Proper combine adjustment keeps harvest losses to a minimum. Wheat varieties vary in tightness of chaff and ease of threshing. Oats, with a weaker straw than wheat or barley, sometime present additional harvesting problems. Storms, wind and rain may cause severe lodging of oats, increasing harvesting cost and reducing grain quality. Where lodging or shattering occurs or threatens, or where weeds are a problem or when grain ripens unevenly, windrow the oats and use a pickup attachment to combine the crop. An oat crop is usually damaged less by rains when in the windrow than if standing full ripe.

Oats in the soft dough growth stage may be used for ensilage. A good oat crop yields 6 to 10 tons silage and can be made into silage earlier in the season than other crops. Oats also make a valuable hay crop when cut while the leaves and stems are still green and the grain is in the soft dough stage. Oat straw is the most palatable and nutritious of cereal straws.

Barley can be made into good quality hay if cut at the early dough stage before the awns harden. However, it is not used extensively for hay.

Texas produced barley is not used for malting, because presently grown varieties are not acceptable to the malting trade. However, recent increases in cattle feedlot activity on the High Plains has led to improved market demand.

Spring Seeding

Spring seeding of wheat, oats and barley is not recommended because yields are much lower than those of fall-seeded varieties. Spring-seeded crops must be seeded and established during low rainfall, cool temperatures, high winds and spring freezes. When the fall-seeded crop is winterkilled, spring seeding may be substituted, but look for lower yields and quality.

Grain Marketing

Grain producers may: (1) contract their crop at a given price to a local buyer before harvest, then deliver the grain at harvest for cash; (2) "hedge" their growing crop on the futures market, then liquidate the "hedge" at harvest and deliver the grain to a local buyer for cash; (3) deliver and sell their crop at harvest to a local buyer for cash; (4) store the harvested crop either on-farm or in a commercial elevator for cash sale at some later date; or (5) place the harvested crop in an approved facility where government loan is available for cash sale at some later date either to a local buyer or by redeeming the loan and delivering title of the grain to the government. Others suitably equipped may choose to market all or a portion of their crop for seed purposes.

Each method has advantages and disadvantages. For example, where the producer elects to store grain at his expense for cash sale at some later date, estimated dry matter and moisture shrinkage must be computed, along with storage-handling and interest costs. These costs must be compared with expected future changes in cash prices to determine the profitability of this option.

Economics of Production

Increased production efficiency may be achieved by adopting practices proven profitable through research and result demonstrations. Decisions to adopt improved production practices are made by considering added costs versus added returns due to change in practices. Consider first production practices which affect costs and/or income most. Soil fertility, moisture management, insect control, weed control, disease control, variety selection and harvesting influence the profitability of small grain.

Adequate records and accounts are necessary for measuring progress and making changes in production practices.

Estimated Yield, Price, Income, Production Costs, Harvesting Costs and Income Over Specified Costs per Acre for Wheat, Oats and Barley

	Wheat	Oats	Barley
Yield—bushels per acre	20	40	30
Price—dollars per bushel	1.25	.70	.85
Grazing—4 mo @ $1.50/mo/ac	6.00	6.00	6.00
Income—dollars per acre[1]	$31.00	$34.00	$31.50
Preharvest costs per acre			
Seed—(wheat ¾ bu, oats 2 bu, barley 1 bu)	$ 1.88	$ 3.00	$ 2.00
Insecticides and application	2.00	2.00	2.00
Fertilizer—60-40-0	8.40	8.40	8.40
Machinery	2.30	2.30	2.30
Labor	2.40	2.40	2.40
Insurance	1.50	1.50	1.50
Interest on operating capital—8% for 6 mo	.74	.78	.74
Total specified preharvest costs	$19.22	$20.38	$19.34
Harvesting costs per acre			
Combining—custom	$ 4.00	$ 4.00	$ 4.00
Hauling—custom 7¢/bu	1.40	2.30	2.10
Total specified harvesting costs	$ 5.40	$ 6.80	$ 6.10
Total specified preharvest and harvesting costs	$24.62	$27.18	$25.44
Income over specified costs[2]	$ 6.38	$ 6.82	$ 6.06

Cultural Practices, Usual Dates, Times Over, Hours per Acre, Cost per Hour, Cost per Acre and Harvesting Wheat, Oats, Barley

Cultural practice	Usual dates	Times over	Hours per acre		Cost per hour		Cost per acre	
			Labor	Machinery	Labor	Machinery	Labor	Machinery
Hoeme	July-Aug.	3	.78	.65	$1.50	$1.73	$1.17	$1.12
Chisel	July	1	.24	.2	1.50	1.73	.36	.35
Harrow	Aug.	1	.12	.1	1.50	1.73	.18	.17
Fertilize	Sept.	1	.18	.15	1.50	1.73	.27	.26
Plant	Oct.	1	.28	.23	1.50	1.73	.42	.40
Spray	April (aerial)	1	Custom					
Harvest	May-June	1	Custom					
Total			1.6	1.33			$2.40	$2.30

[1]Income does not include any government payments.
[2]Costs do not include unallocated overhead costs such as interest, taxes and insurance on farm real estate and machinery, depreciation on farm buildings and machinery and pickup expense.

Cooperative Extension Work in Agriculture and Home Economics, Texas A&M University and the United States Department of Agriculture cooperating. Distributed in futherance of the Acts of Congress of May 8, 1914, as amended, and June 30, 1914.
15—8-69